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			OH, TAYLOR V	
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/996,480  
Filing Date: November 20, 2001  
Appellant(s): GRUZINS ET AL.

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Wanli Wu  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 3/20/08 appealing from the Office action mailed 4/23/07.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US 6,103,822

HOUSEL et al

8-2000

WO 98/50338

KOISTINEN

11-1998

March, Jerry. Advanced Organic Chemistry : reactions, mechanisms and structure, 1992, John Wiley & Sons, 4th ed. p.393

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

#### **The Status of Claims**

Claims 1-25 , 27-29, and 31 are pending.

Claims 1-25 , 27-29, and 31 are rejected.

#### ***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-25 and 27-29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Housel et al (U.S. 6,103,822) in view of Koistinen et al (WO 98/50338).

Housel et al teaches polymeric polyols which can be an esterification product of at least polyester polyols, polyether polyols, polyetherester polyols (see col. 3, lines 55-57) obtained from the reaction of a diol and /or a polyol and a dicarboxylic acid or its anhydride (see col. 6, lines 28-42) in the presence of tin metal oxide catalysts (see col. 13, lines 19-21) in an amount of from 0 to 30,000 ppm (see col. 13, lines 22-24) for the purpose of controlling the reaction (see col. 8, lines 1-3). The polymeric acid functional polyol has an acid value of from 10 to 150, a hydroxy value of from 20 to 500 and a hydroxy functionality of at least 2, and preferably from 2 to 4 (see col. 3, lines 46-54).

Furthermore, aliphatic diacids used in the esterification reaction are oxalic acid, malonic acid, succinic acid, glutaric acid and their anhydrides; in addition,

the polyols useful in the esterification reaction can be monomeric or polymeric (see col. 9, lines 60-67). Exemplary monomeric polyols include ethylene glycol, trimethylol propane and etc. (see col. 10, lines 5-8). Besides, for the manufacturing polyester polyols, the reactant carboxylic acids may render a residual acid value of less than 10 mg KOH/g with polyester polyols having acid values less than 1.5 (see col. 1, lines 35-40).

Moreover, water borne polyurethanes are formed as a urethane reaction product of a polymeric acid functional polyol and a polyisocyanate (see col. 11, lines 5-7), which may be selected from any polyisocyanates useful for preparing polyurethanes (see col. 11, lines 31-32). Valuable polyisocyanates may include 2,2', 2,4'- and 4,4'- diphenylmethane diisocyanates. (see col. 11, lines 54-56).

In addition, water borne polyurethanes may contain primary or secondary polyamines as chain extenders, property modifiers, or crosslinkers and their examples are 1,2-ethylenediamine, hexamethylene diamine, isophorone diamine, 2,2-cyclohexylamine, and etc. (see col. 12, lines 50-59).

Also, in one of the examples (#9), an acid functional polyol product has a hydroxy functionality of at least 2, and a viscosity of 12100 cps at 250<sup>0</sup> C. (see col. 19, lines 5-15).

The instant invention, however, differs from the prior art in that the claimed reaction product is formed in the presence of an organic acid or inorganic acid; the polyol composition has an oligomer content of less than 30 mg KOH/g.

Koistinen et al discloses the process of preparing complex polyol esters by reacting a polyol with mono- and polybasic acids and/ or anhydrides (see page 3 , lines 9-10) in the presence of a catalyst , such as sulfuric acid, hydrochloric acid or metal oxides, such as titanates or tin oxides (see page 3, lines 17-18) in the amount of from 0.05 to 0.5 % of the reacting components (see page 3, lines 16-18); the reaction mixture is treated with a base to neutralize the acid components, and the complex esters are retrieved (see page 1, lines 6-10). In the process, all the reactants are heated for 3-10 hours at 180-240<sup>0</sup> C until the acid number has decreased below 10 mg KOH/g (see page 3, lines 12-15).

With respect to the oligomer content of less than 30 mg KOH/g, the reference does indirectly indicate the oligomer content in view of the passages of the prior art (see col. 4, lines 9-16), which describes that the reaction is terminated when the acid functional polyol has an acid value of from 10 to 150 during the process for making the polymeric acid functional polyol based on the esterified products. Therefore, it does teach that the prior art's polyol composition has an oligomer content of less than 30 mg KOH/g.

Housel et al does describe the polymeric acid functional polyol which is the reaction product of polyols and the acid anhydride in the presence of tin

metal oxide catalysts (see col. 13, lines 19-21) in an amount of from 0 to 30,000 ppm (see col. 13, lines 22-24) for the purpose of controlling the reaction.

Similarly, Koistinen et al discloses the process of preparing complex polyol esters by reacting a polyol with mono- and polybasic acids and/or a cyclic anhydride (see page 3, lines 9-10) in the presence of a catalyst, such as sulfuric acid, hydrochloric acid or metal oxides, such as tin oxides.

Both prior art have commonly been dealt with the production of carboxy-containing polyol composition by reacting the polyols and the carboxylic acids and/or their anhydrides during the esterification process; furthermore, the Koistinen et al has offered guidance that there is an equivalence of teaching regarding the use of the catalyst between the hydrochloric acid and tin oxides.

Therefore, it would have been obvious to the skillful artisan in the art to be motivated to employ the hydrochloric acid catalyst of Koistinen et al into the Housel et al process as an alternative to the tin oxide catalyst of the Housel et al process because the skilled artisan in the art would expect such a modification to be successful and feasible as guidance shown in Koistinen et al .

#### **(10) Response to Argument**

Appellants argue that Housel et al does not describe the use of any acid catalyst in the process except employing organotin and amine catalysts; the use of the phrase "minor amounts of catalysts" fails to disclose any specific catalysts or class of catalyst other than those with organometallic catalysts.



Appellants' argument has been noted, but the argument is not persuasive. The Housel prior art does teach not only organotin and amine as catalysts, but also the use of the phrase "minor amounts of catalysts" in general (see col. 8, line 1) in the process. The term "catalysts" imply that any catalysts would work for the process; this passage may even include well-known acidic catalysts among the catalysts effective for the process. For example, an organic chemistry text book well-known as "Advanced Organic Chemistry" by Jerry March (John Wiley & Sons, 1992, page 393) discloses that they (cyclic anhydrides) are used to prepare carboxylic esters acids often in the presence of the catalysts such as acids and Lewis acids (see page 393, lines 1-3) as described in the following reaction (see page 393, lines 8-9):



In addition, the same reference teaches that the esterification of carboxylic acids with alcohols is conducted in the presence of a most common acid catalyst such as sulfuric acid ( $\text{H}_2\text{SO}_4$ ) or TsOH in the following reaction (see page 393, lines 13-21):



Furthermore, Koistinen et al, the secondary prior art, has expressly offered guidance that there is an equivalence of teaching regarding the use of the catalyst between the hydrochloric acid and tin oxides during the esterification process since both prior art processes have commonly been dealt with the esterification; for example, Housel et al does teach the esterification reaction between the polyol and the dicarboxylic acid or its anhydride(see col. 6, lines 28-42) in the presence of tin metal oxide catalysts(see col. 13, lines 19-21); similarly, Koistinen et al expressly discloses the esterification process of forming complex polyol esters by reacting the polyol with mono- and polybasic acids( dicarboxylic acids) and/or a cyclic anhydride (see page 3, lines 9-10) in the presence of a catalyst, such as sulfuric acid, hydrochloric acid or tin oxides. Moreover, Koistinen et al has pointed out in the claim section that the dicarboxylic acid can be succinic anhydride as disclosed for the one of reactants in the claims 1 and 14 (see page 12, lines 21-23). Therefore, Appellants' argument is not persuasive.

Appellants argue that Housel does raise the potential problems of forming unwanted side reactions as a result of using particular catalysts at a high temperature or those problems associated with the long conversion to the acid polyol as a result of using particular catalysts at a low temperature; furthermore, there are no solutions of the problems in Housel.

Appellants' argument has been noted, but the argument is not persuasive. Regardless of what kinds of potential problems the Housel et al can raise during the use of the particular catalyst at the high or low temperature in the process, this is irrelevant to the claimed invention. This is because the main issue is whether the desired products are successfully formed or not as a result of the Housel process with the addition of the minor amounts of catalysts under the specific reaction conditions, such as a temperature of 50 to 200<sup>0</sup> for a period of from 10 mins to 24 hours; the answer is clearly in the affirmative as shown in the examples 9 and 11 (see col. 19, lines 5-44); the reason for adding the catalysts to the Housel et al process is to control the reaction(see col. 8, lines 1-4). Furthermore, the claims are not directed to resolving any potential problems of forming unwanted side reactions as a result of using particular catalysts at a high or low temperature. However, the claims are directed to a low viscosity carboxyl containing polyol composition. The Housel directly teaches this particular aspect of the claimed invention as shown from one of the examples (#9), an acid functional polyol product has a hydroxy functionality of at least 2 , and a viscosity of 12100 cps at 250<sup>0</sup> C. (see col. 19, lines 5-15). Therefore, Appellants' argument is not persuasive.

Appellants argue that, although Koistinen et al does disclose a process for manufacturing poly complex esters by reacting a polyol with mono- and polyvalent acids in the catalyst, such as sulfuric acid and hydrochloric acid, the Koistinen et al

exemplifies only tin oxide with a high amount in all of the working examples, which teaches away from the claimed invention.

Appellants' argument has been noted, but the argument is not persuasive. Regardless of how a large amount of the catalyst is used in the examples, Koistinen et al expressly teaches in the specification that the amount of catalyst used is typically 0.05-0.5 % (500 ppm to 5000 ppm) of the reacting components (see page 3, lines 18-19). From this information, the lower limit of the catalyst usage (500 ppm) in the prior art does fall on the claimed range of catalyst amount, which is from 5 to 500 ppm. Therefore, applicants' argument is irrelevant to the issue of the claimed invention.

Furthermore, unlike applicants' arguments about the sole use of the tin oxide catalyst in every example of Koistinen et al, a close examination of Example 4 does reveal the following (see page 5, lines 23-30):

**Example 4**

The reactants (BEPD, catalyst, adipic acid and octanoic acid and solvent) were measured into a retort and heated for 7 h 200 - 220 °C. A low flow of nitrogen was maintained in order to make the removal of water more efficient. A solvent mixture (LIAV 270) with high boiling temperature was used for solvent, its amount was 30 % of the reactants. After the reaction had come to its end, the catalyst was filtered away while the reaction blend was still hot. After the reaction mixture had cooled, 3 weight-% triethylamine was added, and the mixture was blended for ca 3 hours at 70 - 80°C.

From this example, it becomes so clear that the use of a generic "catalyst" among the reactants in the example 4 does imply that any catalyst, such as sulfuric

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acid, hydrochloric acid or metal oxides, such as tin oxides described in the passages of the specification(see page 3, lines 12-18) would work for the process.

Therefore, Appellants' argument is not persuasive.

Appellants argue that the skilled artisan in the art would not look to Koistinen et al to modify the Housel et al process because of the consequence of the potential catalyst problems in the Housel et al and the only use of the tin oxide specified in all the examples of Koistinen et al.

Appellants' argument has been noted, but the argument is not persuasive. Regardless of what kinds of potential problems the Housel et al might raise during the use of the particular catalyst in the process, the main issue is that the desired products are successfully formed with the addition of the minor amounts of catalysts under the specific reaction temperature and period; furthermore, the role of adding the catalyst to the process is to control the reaction process so that the process for forming the desired products will be smooth.

Furthermore, Housel et al does teach the esterification reaction between the polyol and the dicarboxylic acid or its anhydride (see col. 6, lines 28-42) in the presence of tin metal oxide catalysts (see col. 13, lines 19-21); similarly, Koistinen et al expressly discloses the esterification process of forming complex polyol esters by reacting the polyol with mono- and polybasic acids( dicarboxylic acids) and/or the cyclic anhydride (see page 3, lines 9-10) in the presence of a catalyst, such as sulfuric acid, hydrochloric

acid or tin oxides. Both prior art are commonly involved in the esterification process by reacting the polyols and the carboxylic acids and/or their anhydrides. Moreover, there is a motivation for the skilled artisan in the art to modify the tin oxide catalyst of the Housel et al process with that of Koistinen et al since the unspecified catalyst used in the example 4 proved a successful yield (69 %) as a result of the process shown in Table 1 (see page 6, table 1, #4). This means that the esterification process conducted in the presence of any catalyst, such as sulfuric acid, hydrochloric acid or metal oxides, such as tin oxides described in the passages of the specification(see page 3, lines 12-18) would work equally well for the process. Therefore, it would have been obvious to the skillful artisan in the art to be motivated to employ the hydrochloric acid catalyst of Koistinen et al into the Housel et al process as an alternative to the tin oxide catalyst of the Housel's et al because the skilled artisan in the art would expect such a modification to be successful and feasible as guidance shown in Koistinen et al.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Taylor Victor Oh/

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5/22/08

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